PRINTABLE VERSION

Practice Test 1

Question 1

The graph of the function $f(x) = \dfrac{x^2 - 3x + 2}{2x^3 + 5x^2 - 3}$ has a horizontal asymptote. If the graph crosses this asymptote, give the x-coordinate(s) of the intersection. Otherwise, state that the graph does not cross the asymptote.

a) The graph does not cross the asymptote.

b) $x = 2$ and $x = 4$

c) $x = 1$ and $x = 2$

d) $x = 0$

e) $x = -1$ and $x = -2$

Question 2

Given $f(x) = \sqrt{3x - 5}$ and $g(x) = x^2 - 4x - 12$, find the domain of $\dfrac{g}{f}$.

a) $\left[\frac{5}{3}, 6\right) \cup (6, \infty)$

b) $\left[\frac{5}{3}, \infty\right)$

c) $\left(-\infty, \frac{5}{3}\right) \cup \left(\frac{5}{3}, \infty\right)$

d) $(-\infty, -2) \cup (6, \infty)$

e) $\left(\frac{5}{3}, \infty\right)$

Question 3

Given $f(x) = \dfrac{x - 2}{x + 1}$, simplify $\dfrac{f(x + h) - f(x)}{h}$, $h \neq 0$ when $x = 3$.

a) $\dfrac{3}{4h - 16}$

b) $\dfrac{3}{4h + 16}$

c) 0

d) $\dfrac{h - 2}{h + 1}$

e) $\dfrac{4h + 1}{4}$

Question 4

Solve $\sin(9x) = 1$ on the interval $\left[0, \dfrac{2\pi}{9}\right]$.

a) $x = 0$

b) $x = \dfrac{\pi}{18}$

c) $x = \dfrac{\pi}{4}$

d) $x = \dfrac{3\pi}{4}$

e) $x = \dfrac{\pi}{6}$

Question 5

Given $f(x) = \dfrac{5x^2 - 10x}{6x^2 - 24}$, identify any vertical asymptotes.

a) $x = 0$

b) $x = -2$

c) $x = \dfrac{5}{6}$

d) $x = 2$

e) There are none.

Question 6

Find the exact value of the following expression. If undefined, state, *undefined*.

$$\cos\left(\sin^{-1}\left(\frac{3}{5}\right)\right)$$

a) *undefined*

b) $\frac{4}{5}$

c) $\frac{5}{4}$

d) $\frac{4}{3}$

e) $\frac{3}{4}$

Question 7

Evaluate: $\lim_{x\to -5} \frac{x+5}{x^2+11x+30}$

a) $\frac{1}{10}$

b) 10

c) does not exist

d) $-\frac{1}{10}$

e) $-\frac{1}{5}$

Question 8

Evaluate the limit: $\lim_{x\to 100} \frac{\sqrt{x}-10}{x-100}$

a) 1

b) $\frac{1}{20}$

c) 10

d) 20

e) $\frac{1}{10}$

f) Does not exist.

Question 9

Evaluate the limit: $\lim_{x \to 0} \frac{4 - \frac{3}{x}}{2 + \frac{4}{x^2}}$

a) -1

b) 0

c) $-\frac{3}{4}$

d) 2

e) -2

f) Does not exist.

Question 10

Evaluate: $\lim_{x \to 0} \frac{\tan^2(6x)}{5x^2}$

a) $\frac{5}{36}$

b) $\frac{36}{25}$

c) does not exist

d) $\frac{36}{5}$

e) 0

Question 11

Give the values of A and B for the function $f(x)$ to be continuous at both $x = 1$ and $x = 6$.

$$f(x) = \begin{cases} Ax - B & x \leq 1 \\ -30x & 1 < x < 6 \\ Bx^2 - A & x \geq 6 \end{cases}$$

a) $A = -35$ and $B = -6$

b) $A = -36$ and $B = -5$

c) $A = -37$ and $B = -6$

d) $A = -36$ and $B = -7$

e) $A = -36$ and $B = -6$

Question 12

For which of the following functions can we use the Intermediate Value Theorem to prove the existence of roots in the indicated interval?

I. $f(x) = \dfrac{x - 3}{x}$, $[-2, 2]$

II. $f(x) = x^2 + 9$, $[-2, 2]$

III. $f(x) = 3x^3 - 9x$, $[-2, 2]$

a) I and III only

b) II and III only

c) I and II only

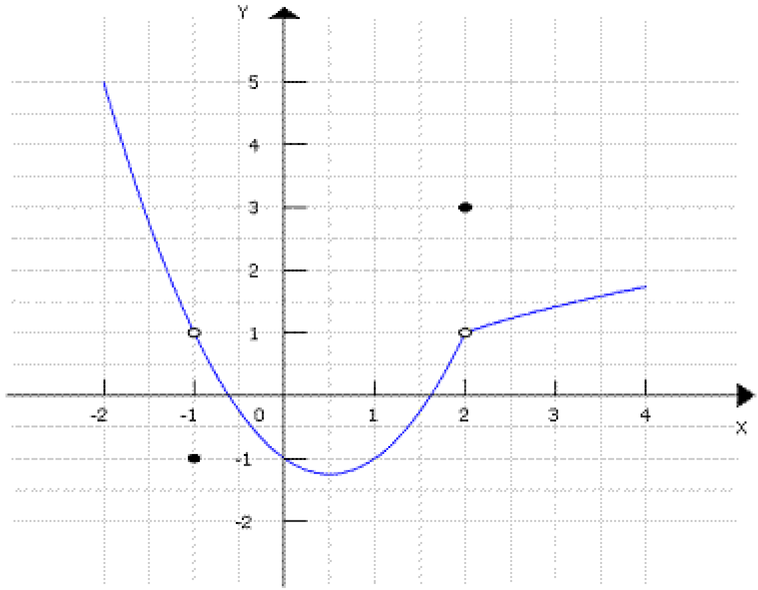
d) II only

e) III only

f) I, II and III

Question 13

Given $c = -1$ and the graph of the function f below,



Use the graph to find $\lim_{x \to c} f(x)$.

a) does not exist

b) 1

c) -1

d) 0

e) -2

Question 14

Find the vertical asymptote(s) for the function $f(x) = \dfrac{x^2 - x - 2}{x^2 - 6x + 8}$

a) $x = 4$

b) There are no vertical asymptotes.

c) $x = 2$

d) $x = 4,\ x = 2$

e) $y = 1$

f) None of the above.

Question 15

Find $\lim_{x\to\infty} \dfrac{(x+4)(x-1)(x-6)}{-3x^3 - 1x^2 + 5x - 4}$.

a) -3

b) $-\dfrac{1}{3}$

c) $\dfrac{1}{3}$

d) -4

e) 1

f) 0

g) None of the above.

Question 16

Find the inverse if it exists given $f(x) = 2x^5 + 6$.

a) $f^{-1}(x) = \left(\dfrac{x+6}{2}\right)^5$

b) $f^{-1}(x) = \sqrt{\dfrac{x-6}{2}}$

c) No inverse exists.

d) $f^{-1}(x) = \sqrt{\dfrac{x+6}{2}}$

e) $f^{-1}(x) = \left(\dfrac{x-6}{2}\right)^{1/5}$

f) $f^{-1}(x) = \left|\left(\dfrac{x-6}{2}\right)^5\right|$

g) $f^{-1}(x) = \left(\dfrac{x+6}{2}\right)^{1/5}$

Question 17

The function $f(x) = \dfrac{x^2 - 25}{x - 5}$ is defined everywhere except at $x = 5$. If possible, define f at $x = 5$ so that it becomes continuous at $x = 5$.

a) Not possible because there is a jump disconinuity at the given point.

b) Not possible because there is an infinite disconinuity at the given point.

c) $f(5) = 10$

d) $f(5) = 0$

e) $f(5) = \dfrac{1}{10}$

Question 18

Given $f(x) = \dfrac{x}{3x+2}$ which of the following expressions will represent $f'(x)$?

a) $\displaystyle \lim_{h \to 0} \frac{\dfrac{x+h}{3x+3h+2}}{h}$

b) $\displaystyle \lim_{h \to x} \frac{\left(\dfrac{x+h}{3x+3h+2}\right) - \left(\dfrac{x}{3x+2}\right)}{h}$

c) $\displaystyle \frac{\left(\dfrac{x+h}{3x+3h+2}\right) - \left(\dfrac{x}{3x+2}\right)}{h}$

d) $\displaystyle \lim_{h \to 0} \frac{\left(\dfrac{x+h}{3x+3h+2}\right) - \left(\dfrac{x}{3x+2}\right)}{h}$

e) $\displaystyle \lim_{h \to 0} \frac{\left(\dfrac{x}{3x+2} + h\right) - \left(\dfrac{x}{3x+2}\right)}{h}$

Question 19

For the following limit, find the largest δ that *works* for ε = 0.5.

$$\lim_{x \to 2}(3x - 1) = 5$$

a) $\frac{3}{2}$

b) $\frac{1}{6}$

c) $\frac{1}{2}$

d) 1

e) 2

Question 20

$$\lim_{x \to 0} \frac{\sin(5x)}{\sin(7x)} =$$

a) 1

b) $\frac{7}{5}$

c) $\frac{5}{7}$

d) 0

e) The limit does not exist.

Question 21

Evaluate the limit: $\lim_{x \to 4^+} f(x)$. Given that

$$f(x) = \begin{cases} 2x - 2 & x \leq 4 \\ x^2 - x & x > 4 \end{cases}$$

a) 1

b) 12

c) 0

d) does not exist

e) 6

Question 22

I understand that I am expected to know all definitions and theorems from sections 1.2 - 2.1.

a) ◯ Yes

b) ◯ No

Question 23

I understand that I am expected to know all prerequisite material from Quiz 0.

a) ◯ Yes

b) ◯ No